XXXI.—*Observations on the Genus* Macropis. By W. H. Patton[*].

Hermann Müller found the females of the European *Macropis labiata*, Panz., upon the flowers of *Lysimachia vulgaris* only, while the males occurred also upon the flowers of *Œnanthe fistulosa*, *Rhamnus frangula*, and *Rubus fruticosus*[†]. This is the basis upon which Sir John Lubbock has made and repeated the statement, that "the species visits exclusively *Lysimachia vulgaris*"[‡]. Yet Dufour had previously taken both sexes upon *Alisma Plantago*, and Schenck had taken either one or both sexes upon *Bryonia*, *Rubus cæsius*, *Circium arvense*, and *Picris*. Subsequently Mr. John B. Bridgman has taken the male upon *Cirsium arvense*[§] and upon *Lysimachia*, Mint and Marsh Potentilla, and the female upon *Circium arvense* and *Lysimachia*[||]. I have taken the female of the American species upon *Lysimachia ciliata*[¶], *Rhus glabra* and *R. typhina*, and *Archangelica hirsuta*, and the male upon *Rubus villosus* and *Cornus paniculata*.

Yet there appears to be some peculiar relationship between the *Macropis* and the *Lysimachia*. Collecting in 1874 and 1875, I observed that the *females taken upon other flowers had no pollen masses* upon their legs, and were indeed upon another quest. Mr. Bridgman (*l. c.* 1878, p. 22) observed that the females taken on *Cirsium arvense* had no pollen. Can it be that the young live upon the pollen of *Lysimachia* only, just as other insects are restricted to the foliage of particular plants?

Hermann Müller (*l. c.* p. 248), observing that the pollen was collected upon the tibiæ of these bees in thick *moist* balls, and unable to find any honey in the flowers of *Lysimachia*

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[*] From Silliman's 'American Journal,' Sept. 1879, pp. 211–214.

[†] 'Die Befruchtung der Blumen durch Insecten,' pp. 348 and 463 (1873).

[‡] Belfast Address, 1874; 'Nature,' vol. x. p. 425, and 'British Wild Flowers in Relation to Insects,' p. 21. The inconsistency of his statement appears when he says ('British Wild Flowers,' p. 126) that "*Lysimachia vulgaris* produces no honey;" and the question arises in the mind of the reader, where do the bees get the honey upon which they must live?

[§] Newman's 'Entomologist,' Aug. 1876, p. 158.

[||] Ibid., Jan. 1878, vol. xi. p. 22.

[¶] The group of Lysimachias containing *L. ciliata* has recently been set apart as a distinct genus, *Steironema*, Raf., by Prof. Gray (Proc. Am. Acad. vol. xii. p. 62) because of differences in the æstivation of the corolla; but for our present purposes, *Tridynia* (containing *stricta* and *quadrifolia*), *Lysimachia* (containing *vulgaris*), and *Steironema* may be treated together under the name *Lysimachia*.

vulgaris, was led to believe that the bees pierced the cellular tissue of the flowers with the *ligula* for the juices with which to moisten the pollen. This act of the bee seems to me both impossible and unnecessary. The ligula is too weak; and if we are to look to the *Lysimachia* for a solution of the problem, it is well to ask whether the glands with which the filaments and base of the corolla are beset may not furnish the nectar. In the American *L. ciliata*, *L. quadrifolia*, and *L. stricta*, and on the filaments at least of the European *L. vulgaris* the glands are very numerous. But upon the flowers of *stricta* and *quadrifolia* the *Macropis* has not yet been found, although the flowers have been often watched; it seems, therefore, that the glands afford no attraction. We must conclude that it is with nectar that the pollen is moistened; and as it has been my good fortune to distinctly observe a female *Macropis* sucking nectar from the flowers of *Rhus glabra*, it is evidently from these and other flowers that the *Macropis* obtains the honey for the food both of itself and its young.

But why does the *Macropis* moisten the pollen as it is collected? this is an unusual habit. The social bees moisten it in order that it may be retained on the pollen plates. The Scopulipede and Gastrilege bees retain the dry pollen with the hairs forming the pollen-brushes. The *Lysimachia* pollen is not of so dry a nature that hairs would not hold it. An altogether new interest was given to the genus *Macropis* by Hermann Müller's observation that it alone of all the solitary bees of Germany moistened the pollen as collected, thus economizing the expanse of hairs upon the legs*. The retaining-hairs upon the posterior legs of *Macropis* are unusually short. By moistening the pollen they are enabled to retain much larger masses than they otherwise could. Such, also, is the habit, as I have observed, of the allied American genera *Scrapter*, *Calliopsis*, and *Perdita* (*P. 8-maculata*, Say); and Fritz Müller has recorded the same habit for *Centris*, *Tetrapedia*, and *Epicharis* in Brazil†, although in these latter genera the scopa is long.

On account of the close resemblance which *Macropis* bears to the higher bees, Shuckard ('British Bees') was led to believe that it would be found to agree with them in their noisy flight also. But repeated observations in the field, under the most favourable circumstances, have satisfied me that their flight is perfectly silent. Yet Shuckard is not correct when he says the other Andrenidæ are mute; for I have observed that certain species of *Colletes*, *C. armata*, mihi, and *C. compacta*, Cress., and possibly some of the larger species of *Andrena*, make, during flight, a distinct hum, much like that of the honey-bee.

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* *L. c.* p. 47, and Anw. d. Darw. Lehre auf Bienen, p. 22 (1872).

† 'Nature,' vol. x. p. 103. These observations by Fritz Müller are open to doubt. In *Centris*, as in our native genera *Diadasia* (n. g.) and *Melissodes*, the hairs of the scopa are conspicuously plumose, and the pollen would have a matted appearance even when dry. It can be stated with confidence that, even if the pollen is slightly moistened by these bees, it is not formed into a paste, as it is by the social bees.

Up to the present time no French* or English author has questioned the validity and naturalness of the two groups *Abeille* and *Proabeille*, into which Réaumur divided all the bees. Kirby adopted this classification, employing the names *Apis* and *Melitta*; Latreille adopted it under the names *Apiariæ* and *Andrenetæ*; and all subsequent authors have employed the same classification, either under these names or under Leach's family names Apidæ and Andrenidæ. Yet the only characters given for separating the Apidæ and Andrenidæ which are not entirely erroneous are:—

Apidæ: labium longer than mentum, basal joints of labial palpi elongate, labium slender and not flattened.

Andrenidæ: labium shorter than mentum, basal joints of labial palpi not unlike the following joints, labium flattened.

But in the genus *Scrapter* (placed among the Andrenidæ) the palpi are precisely as in *Calliopsis* (placed among the Apidæ), and, as I have observed, the labium in repose is of precisely the same length—in both extending to the tip of the basal joint of the palpi. The greater breadth of the labium in *Scrapter* can alone determine to which family it belongs; and this difference in breadth is imaginary rather than real. Moreover, in the genera *Megalopta* and *Oxistoglossa*, and some groups of the genus *Nomia* (genera placed among the Andrenidæ), the labium is as slender as in the Apidæ; and in the genus *Hyleoides* (placed among the Andrenidæ) the joints of the labial palpi are proportioned just as in certain of the Apidæ.

Rejecting, therefore, the families Andrenidæ and Apidæ, and without proposing, at present, a more natural classification for the ANTHOPHILA, *Macropis* may be removed from connexion with the short-tongued bees and placed between the *Andrenoides* and *Scopulipedes*. In the greater number of its characters it is allied to the *Andrenoides*; but in single characters of great value it bears relationship to other very diverse groups. With the *Andrenoides* it agrees in the venation of the anterior wings, which differs from that of *Scrapter* and *Calliopsis* in the pointed marginal cell only, in the cleft claws of the female, and in the habit of moistening the pollen as collected. With *Andrena* it agrees in the form of the tongue and palpi. With the *Scopulipedes* it agrees in the short anal lobe of the posterior wings and in general appearance. In the form of the basal joint of the posterior tarsi of the female it agrees with none but the social bees, which also have the habit of moistening the pollen as collected.

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* As Lepeletier failed to recognize the *Bees* as a natural group, he cannot be said to have presented any classification of them.

MACROPIS, Panz. (1809).

Ocelli in a slight curve; face slightly narrowed beneath; clypeus not elevated, yellow in the male; labium transverse, entire; mandibles stout, obtusely bidentate; maxillary palpi 6-jointed, the sixth and one half of the fifth joints extending beyond the apical lobe of the maxillæ; labium lanceolate, one third the length of the mentum, the latter narrowing toward the base, the paraglossæ small; joints of the labial palpi decreasing in length successively, the basal joint equal in length to the second and third taken together. The flagellum in the female subclavate, the first joint ovate, the second narrowed toward the base and one third longer than the first joint, the third and fourth joints equal and when taken together shorter than the second joint, the apical joint obliquely truncate; in the male the first joint of the flagellum is globose, the second scarcely longer than the first, the third scarcely one half as long as the second, the fourth about equal in length to each of the following joints, the flagellum not clavate, but longer than in the female. The anterior wings have two submarginal cells, the second receiving both recurrent nervures, the origin of the first recurrent nervure far beyond the origin of the cubital nervure; the stigma of good size; submarginal bullæ six, two on the first transverse nervure, one on the second, one on the first recurrent nervure, two on the second; basal lobe of the posterior wings extending beyond the middle of the submedian cell. Both sexes have the tarsal claws cleft, and a distinct enclosure at the base of the posterior tibiæ. Posterior femora of the male swollen; posterior tibiæ in both sexes robust; basal joint of the posterior tarsi of the female quadrate, flattened, the upper angle not produced, the second joint attached at the lower angle; the posterior tibiæ and the basal joint of the posterior tarsi of the female clothed with a short dense pubescence, upon which the pollen is collected in moist masses; basal joint of the posterior tarsi of the male armed with a regular comb of long teeth projecting from the inner margin of the lower face. Sixth segment of the abdomen of the female with a smooth enclosure on the disk. The seventh segment in the male with a triangular pyramidal projection on the disk, the apex of the projection obtuse, the anterior and longest side polished.

XXXII.—Tintinnus semiciliatus, *a new Species of Infusoria.*

By Dr. V. STERKI[*].

THERE are so many "new species" of Infusoria that it is hardly fair to publish separately the discovery of a single one. As regards the present species this course is taken because it appears specially adapted to interest us, with regard to the establishment of certain morphological characters.

The body of the animal is of the same form as that of *Tintinnus fluviatilis*, St.,—elongated, usually drawn out at the hinder end into a peduncle, by which it is fixed in a tube formed and inhabited by it. This peduncle is thin, but not abruptly marked, the body passing gradually into it. The mode of contraction is characteristic, and differs both from that of the Vorticellinæ and of the Stentorinæ; the peduncle simply shortens until it almost disappears, but without the body essentially changing its form. The animals were frequently to be met with outside the above-mentioned tubes. Whether they had fallen out, or, in other words, had been torn out, or whether they occur so normally, I am unable to say. The latter is the more probable supposition from the analogy of *T. fluviatilis*; only it may be remarked that even after the lapse of considerable time they had not commenced the formation of new tubes. In this "free" state they were entirely destitute of a peduncle, an indication of which was frequently to be seen only as a little stump; otherwise the body was perfectly rounded behind. In some cases a portion was half-constricted off behind; this state was probably produced traumatically by pressure. Even when observed for a long time this constriction went no further; so that in this case there could be no question of division. The length of the body (without cilia) is 0·04–0·06, with the peduncle 0·1–0·12, and the diameter about 0·03 millim.

At the anterior end the body is somewhat narrowed, truncated transversely, with a portion of firmer substance pro-

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[*] Translated by W. S. Dallas, F.L.S., from the 'Zeitschrift für wissensch. Zoologie,' Bd. xxxii. (1879) p. 460.